CLAIMS

What is claimed:

1   1.   An immersive scanning device for imaging a scene comprising:

2   a head unit configured to receive an image light beam and generate an image data

3   signal, said head unit comprising a rotating mirror for receiving said image light

4   beam and an optical receiver for receiving said image light beam from said mirror

5   and outputting said image pixel data signal in response thereto, said image data

6   signal comprises a pixel image signal and a pixel distance signal; and

7   a support unit for supporting and rotating said head unit.

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1   2.   The immersive scanning device of claim 1, wherein said optical receiver

2   further comprises a distance generation unit for generating said pixel distance data signal.

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1   3.   The immersive scanning device of claim 2, wherein said distance

2   generation unit comprises a distance detection unit for generating said pixel distance data

3   signal.

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1   4.   The immersive scanning device of claim 1, wherein said optical receiver

2   further comprises a two dimensional imager for generating a depth image representative

3   of the distance of an object depicted by said pixel image signal from said head unit.

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1   5.   The immersive scanning device of claim 1, wherein said depth image

2   comprises a polar plot depicting the distance of a plurality of objects represented by said

3   pixel image signal from said head unit.

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1   6.   The immersive scanning device of claim 2, wherein said image pixel data

2   represents one pixel of captured image data.

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1   7.   The immersive scanning device of claim 6, wherein said pixel distance

2   data represents the distance of an object depicted by said pixel from said head unit.

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1   8.   The immersive scanning device of claim 2, further comprising a control

2   system for controlling said head unit and said support unit.

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1   9.   The immersive scanning device of claim 2, wherein said optical receiver

2   comprises an imager for receiving said image light beam and generating said pixel image

3   data.

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1   10.   The immersive scanning device of claim 9, wherein said imager comprises

2   a photomultiplier tube(PMT).

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1   11.   The immersive scanning device of claim 9, wherein said imager comprises

2   a plurality of imagers.

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1   12.   The immersive scanning device of claim 2, further comprising a motor for

2   rotating said mirror in accordance with said control system.

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1   13.   The immersive scanning device of claim 2, wherein said optical receiver

2   further comprises an aperture screen for limiting the amount of said image light beam that

3   is received by said imager.

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1   14.   The immersive scanning device of claim 13, wherein said aperture screen

2   comprises an aperture of a predetermined size and shape.

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1   15.   The immersive scanning device of claim 13, wherein said aperture

2   comprises a square shaped aperture.

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1   16.   The immersive scanning device of claim 12, wherein said mirror

2   comprises a 45° angled mirror.

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1   17.   The immersive scanning device of claim 12, wherein said motor rotates

2   between 1000 and 12,000 revolutions per minute during an image capture operation.

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1   18.   The immersive scanning device of claim 2, further comprising a user

2   interface for inputting control variable information.

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1 19.   The immersive scanning device of claim 18, wherein said user interface

2 comprises a graphical user interface (GUI).

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1 20.   The immersive scanning device of claim 17, wherein said pixel image

2 signal comprises data representative of a plurality of pixels captured during one

3 revolution of said mirror.

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1 21.   The immersive scanning device of claim 17, wherein said pixel image

2 signal comprises data representative of 64,000 pixels captured during one revolution of

3 said mirror.

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1 22.   The immersive scanning device of claim 17, wherein said camera support

2 further comprises a sweep motor for rotating said head unit about a predetermine axis of

3 rotation.

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1 23.   The immersive scanning device of claim 22, wherein said sweep motor is

2 controlled by said control system.

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1   24.   A method of capturing an immersive representation of a scene comprising

2   the steps of:

3   generating a distance detection light beam;

4   transmitting said distance detection light beam toward an object within a scene;

5   receiving an image light beam reflected from said object;

6   receiving said distance light beam reflected from said object;

7   providing a limited portion of said image light beam to an imager to produce an

8   image pixel signal representative of a portion of said scene; and

9   providing said distance light beam reflected from said object to a position sensing

10   device to produce a distance signal representative of the distance of said object as

11   depicted by said image pixel signal from a predetermined point.

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1   25.   The method of claim 24, further comprising the step of outputting said

2   image pixel data signal and said pixel distance signal as an image data signal.

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1   26.   The method of claim 24, further comprising the step of storing said image

2   data signal to a storage medium.

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1   27.   The method of claim 24, wherein said step of providing comprises the step

2   of providing a limited portion of said image light beam to an imager to produce a

3   plurality of image pixel signals representative of one pixel of said scene.

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1　　28.　The method of claim 24, wherein said portion of said scene comprises a

2　single pixel.

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1　　29.　An immersive scanning device for imaging a scene comprising:

2　　a head unit receiving an image light beam and generating an image data signal;

3　　a support unit for supporting and rotating said head unit;

4　　said head unit comprises a rotating mirror for receiving said image light beam;

5　　an optical receiver for receiving said image light beam from said mirror and

6　outputting said image pixel data signal in response thereto; and

7　　a control system for controlling the rotation of said head unit and said mirror in

8　accordance with predetermined control variable information.

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1　　30.　An immersive scanning device according to claim 29, further comprising a

2　user interface for inputting said control variable information.

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1　　31.　An immersive scanning device according to claim 29, further comprising a

2　storage memory for storing sad control variable information.

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1　　32.　An immersive scanning device according to claim 30, wherein said user

2　interface comprises a graphical user interface.

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1   33.   An immersive scanning device according to claim 30, wherein said optical

2   receiver comprises an imager responsive to an image light beam for generating a image

3   pixel data signal.

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1   34.   An immersive scanning device according to claim 33, wherein said optical

2   receiver further comprises an aperture screen for limiting the amount of image light that

3   is received by said imager.

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1   35.   An immersive scanning device according to claim 34, wherein said optical

2   receiver further comprises a focusing lens for focusing an image light beam onto said

3   aperture screen.

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1   36.   An immersive scanning device according to claim 35, wherein said optical

2   receiver further comprises a distance detection unit for detecting the distance of an object

3   relative to said head unit.

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1   37.   An immersive scanning device according to claim 36, wherein said imager

2   comprises a photomultiplier tube (PMT).

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1   38.   An immersive scanning device according to claim 37, wherein said head

2   unit further comprises a scan motor for rotating said mirror in accordance with a signal

3   from said control system.

1   39.   An immersive scanning device according to claim 38, wherein said

2   support unit further comprises a sweep motor for rotating said head unit in accordance

3   with a signal from said control system.

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1   40.   An immersive scanning device according to claim 39, further comprising

2   an image data storage unit for storing image pixel data representative of a captured scene.